

PATENT ABSTRACTS OF JAPAN

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(54) DIALLYL PHTHALATE RESIN MOLDING MATERIAL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a diallyl phthalate resin molding material having excellent flame-retardance, mechanical properties and electrical properties while decreasing the amounts of a halogen-based flame-retardant and antimony trioxide.

SOLUTION: The diallyl phthalate molding material contains 15-70 wt.% (based on total molding material) diallyl phthalate resin and 75-20 wt.% inorganic base material as essential components and contains a silica gel as the inorganic base material.

CLAIMS

[Claim(s)]

[Claim 1]A diallyl phthalate molding material containing 15 to 70 % of the weight of diallyl phthalate resin, and 75 to 20 % of the weight of inorganic substrates as an essential ingredient, and containing silica gel as an inorganic substrate to the whole molding material.

[Claim 2]The diallyl phthalate molding material according to claim 1 characterized by containing silica gel one to 20% of the weight to the whole molding material.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the diallyl phthalate molding material excellent in fire retardancy, reducing the amount of the halogen series flame retardant used, without spoiling the mechanical property and electrical property which were excellent in diallyl phthalate resin. The molding material of this invention is used suitably for electric electronic components, such as a transformer coil bobbin, switch casing, a tag

block, a connector, and a magnet switch, for example.

[0002]

[Description of the Prior Art]From the electrical property excellent in the diallyl phthalate molding material to an epoxy resin. Along with unsaturated polyester resin, it was used for the electric electronic component, and since it excels in dimensional stability and a water resisting property especially, it has been used for a coil bobbin, switch casing, a tag block, a connector, a magnet switch, etc. Since the characteristic of high intensity and high heat resistance is required as an electric electronic component, the ammonia free type phenolic molding compound is also used, but since it is inferior to an electrical property as compared with said diallyl phthalate resin, the use is limited. Although liquid crystal resin which is high heat resistance as a chip and an object for coil bobbins is also used, cost is highly difficult for application in a general-purpose article.

[0003]Fire retardancy may be needed when diallyl phthalate resin is used for an electric electronic component. Although a halogen series flame retardant and fire-resistant auxiliary agents, such as antimonous oxide, have mainly used them for the diallyl phthalate molding material of a fire-resistant grade from the former, having compounded, The influence on the environment of halogen and the influence of the human body on antimonous oxide are pointed out in recent years, and to reduce a halogen series flame retardant and antimonous oxide is desired.

[0004]

[Problem(s) to be Solved by the Invention]This invention provides the diallyl phthalate molding material which was excellent in fire retardancy and was excellent in the mechanical characteristic and the electrical property, reducing a halogen series flame retardant and antimonous oxide.

[0005]

[Means for Solving the Problem]This inventions are 15 to 70 % of the weight of diallyl phthalate resin, and inorganic matter to the whole (1) molding material. 75 to 20 % of the weight of substrates are contained as an essential ingredient, as an inorganic substrate -- silica gel containing silica gel one to 20% of the weight to a containing diallyl phthalate molding material and the whole (2) molding material -- the feature a diallyl phthalate molding material given in ** (1) paragraph to carry out -- it comes out.

[0006]

[Embodiment of the Invention]Although it is not limited, especially the diallyl phthalate resin used for this invention has the weight average molecular weight 20000-50000, the iodine value 75-90, and a preferred thing of 50-80 ** of softening temperatures, when the viscosity of resin, etc. are taken into consideration. As for the loadings of this diallyl phthalate resin, it is preferred that it is 15 to 70 % of the weight to the whole molding material, and they are 30 to 55 % of the weight more preferably. When molding materialization becomes difficult easily at less than 15 % of the weight and diallyl phthalate resin exceeds 70 % of the weight, a mechanical property may fall. As for diallyl phthalate resin, although anything of an orthotype, isotype, and PARATAIPU can be used, when high heat resistance is required of mold goods, it is desirable to use the thing of isotype or PARATAIPU.

[0007]Next, an inorganic substrate is explained. Although the silica gel used for this invention has various kinds by the difference in the chemical structure of the silica dioxide (SiO_2) of the main ingredients, A colloidal particle has connected densely, and

specific surface area is large, and the type which holds a hydroxyl group on a fine-pores part and the surface has the high adsorption performance (especially moisture) in low humidity, and fits this purpose of use. Specifically, a with the mean particle diameter of 10 micrometers or less, specific surface area ² of 500-1000 m per g, and an oil absorption [per 100g] of 70-250 ml thing is preferred. It is more desirable still more preferred that it is 1 to 20 % of the weight to the whole molding material, and the loadings of silica gel are 5 to 15 % of the weight. When the fire-resistant improved effect of silica gel is small at less than 1 % of the weight and it exceeds 20 % of the weight, a mechanical property may fall. If silica gel, chlorine-based fire retardant, and a fire-resistant auxiliary agent are used together, a chemical mechanism is not clear, but it is thought that a certain synergy occurs and the fire-resistant effect outstanding as compared with the case where each is used independently is acquired.

[0008]Inorganic substrates in particular other than the silica gel used by this invention do not limit, but out of glass fiber, clay, calcium carbonate, talc, magnesium oxide, aluminium hydroxide, etc., suitably, they can be independent, or can be combined and can be used. When the performances (a mechanical property, an electrical property, fire retardancy, dimensional stability, a water resisting property, etc.) required of a diallyl phthalate molding material are taken into consideration, it is more preferred to use glass fiber and clay. Some [, such as aluminium hydroxide,] inorganic substrates also have an effect as a fire-resistant auxiliary agent. As for the loadings of an inorganic substrate, it is preferred that it is 75 to 20 % of the weight to the whole molding material, and they are 60 to 35 % of the weight more preferably. Molding material-ization may become difficult, when a mechanical property and heat resistance fall easily at less than 20 % of the weight and an inorganic substrate exceeds 75 % of the weight.

[0009]As fire retardant used in this invention, a DEKURO lamp lath (par chlorocyclopentadecanone), chlorinated polyethylene, a chlorinated paraffin, etc. which are chlorine-based fire retardant are mentioned. As a fire-resistant auxiliary agent used in this invention, antimonous oxide, aluminium hydroxide, magnesium hydroxide, boric acid, zinc borate, etc. are mentioned. these fire-resistant auxiliary agents -- suitably, independent, it combines and uses.

[0010]It mixes by the raw material and combination which were explained until now, and also the diallyl phthalate molding material of this invention adds raw materials, such as a release agent, paints, a reactional initiator, and a silane coupling agent, and it kneads using a heating roller, a biaxial extrusion machine, etc., and it is obtained by grinding or corning.

[0011]

[Example]Hereafter, an example explains this invention. It kneaded for 10 minutes with an 80 ** heating roller by the combination shown in Table 1, and the diallyl phthalate molding material was manufactured. Using the obtained molding material, it was made to harden at 160 ** by transfer molding for 3 minutes, and mold goods were produced. About the obtained mold goods, a mechanical property, an electrical property, and fire retardancy were measured. The result is shown in Table 1.

[0012]

[Table 1]

	実施例 1	実施例 2	比較例 1	比較例 2
<組成>				
ジアリルフタレート樹脂	39	39	39	39
反応開始剤	1	1	1	1
ガラス繊維	41	40	42	40
水酸化アルミニウム	0	0	0	10
塩素系難燃剤	6	4	8	4
難燃助剤	6	4	8	4
シリカゲル	5	10	0	0
離型剤	1	1	1	1
着色剤	1	1	1	1
<特性>				
曲げ強さ N/m^2	144	140	145	144
絶縁抵抗(Ω) 煮沸後	2×10^{13}	1×10^{13}	7×10^{13}	8×10^{13}
難燃性 UL94 厚み 0.5mm	V-0	V-0	V-0	V-1

[0013](Notes of table)

"DAPPUS" Diallyl phthalate resin: By DAISO

reactional initiator: -- dicumyl peroxide glass fiber: -- the mean fiber diameter of 11 micrometers, and made in [of 3 mm of fiber length] a chopped strand chlorine-based fire retardant:oxy dental chemical "DEKURO lamp lath"

"PATOX-M" (antimonous oxide) A fire-resistant auxiliary agent: By NIHON SEIKO silica gel: -- mean-particle-diameter [of 4 micrometers], and specific surface area 700m²/g, and oil absorption of 95 ml (per 100g)

release agent: -- calcium stearate colorant: -- carbon black [0014](Measuring method)

1. Bending strength and insulation resistance 3. fire retardancy by JIS K 6911 It is based on UL94. [0015]To the comparative example 1 which is the conventional combination which does not use silica gel, Example 1 and Example 2 reduced the amount of a halogen series flame retardant and the antimonous oxide used, and they were able to acquire equivalent fire retardancy from the result of Table 1, without spoiling an electrical property and a mechanical property by blending silica gel instead. On the other hand, fire retardancy was not able to be acquired although it tried to use for the comparative example 2 aluminium hydroxide which is a common fire-resistant auxiliary agent instead of silica gel.

[0016]

[Effect of the Invention]This invention is a diallyl phthalate molding material which contains 15 to 70 % of the weight of diallyl phthalate resin, and 75 to 20 % of the weight of inorganic substrates as an essential ingredient, and contains silica gel as an inorganic substrate to the whole molding material.

Mold goods excellent in a mechanical characteristic, an electrical property, and fire retardancy can be obtained reducing an environmental impact etc.

Therefore, since the diallyl phthalate molding material of this invention can manufacture easily the mold goods of the electric electronic component which needs these characteristics, it is preferred as an industrial diallyl phthalate molding material.

[Translation done.]